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EPA COMMENTS ON THE LOWRY COALITION'S
JULY 24, 1991 DRAFT ADDENDUM NO. 2
TO THE GROUNDWATER WELL INVENTORY
TECHNICAL MEMORANDUM

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Introduction, page 1, paragraph 3. The Lowry Coalition has used a scenario in their analysis of future pumping that is supposed to constitute a "worst-case" for future pumping. However, a worse-case future scenario would be represented by pumping directly on Section 6 or downgradient of Section 6 in Section 31. The future downgradient scenario should be addressed since it is known that there are domestic wells downgradient of the landfill. This scenario is especially important since HLA's evaluation of upgradient pumping wells indicates a groundwater flow reversal toward the pumping wells.

Introduction, page 2, paragraph 1. The hydraulic parameters used for the Dawson aquifer should include appropriate values from both the IDE and the ASC data. Why wasn't ASC data used?

Introduction, page 2, paragraph 2. The Lowry Coalition states that the "evaluation conducted was to qualitatively evaluate the sensitivity of onsite flow conditions to regional pumping...." A sentence should be added to indicate additional groundwater modelling is being performed at the site for use in the baseline risk assessment, evaluation of fate and transport, and evaluation of remedial alternatives.

Pumping within the Dawson Aquifer, page 3, paragraph 2. The discharge rates for Scenarios 1 and 2 in the Dawson Aquifer total 479 gpm based on the number of wells depicted in Figures 2 and 3 and the pumping rates stated in the text. This does not correspond with the discharge rate of 516 gpm calculated from the Denver Basin Rules

presented in the previous discussion of procedures. The reason for the discrepancy should be noted in the text or revised accordingly.

~~POWER PLANT SITES~~
~~RESULTS~~ In Scenario 1, the small dots are distributed into 12 pumping wells and in Scenario 2 they are distributed into six wells located 1/2-mile from the boundary. Why were 12 wells distributed up to 1/2-mile from the boundary rather than placing six wells pumping at higher rates along the boundary? It would appear that pumping from the six wells at a higher rate along the boundary would have a greater effect on groundwater flow in Section 6.

Pumping within the Denver Aquifer, page 4, paragraph 2. The discharge rates calculated from the Denver Basin Rules, and for the wells represented on Figures 4 and 5 do not correspond. A discharge rate of 2,630 gpm is presented for the Denver Basin Rules and a discharge of 2,444 gpm is presented for the two scenarios. The reason for the discrepancy should be noted in the text or revised accordingly.

Results of Pumping within the Dawson Aquifer, page 6, paragraph 1. The figures presenting the results of the simulations should include the area being pumped, not just the landfill. This allows the reader to see the full effect of groundwater pumping surrounding the site.

The initial potentiometric surface across the Lowry Landfill (Figure 6), which is based on ASC water level data, does not indicate a northeast or northwest trending horizontal component of groundwater flow. This conflicts with the Feasibility Study Phase 1, 2 Report which bases remedial scenarios on the existence of both a northeast and northwest horizontal component of groundwater flow.

**REVIEW COMMENTS OF
CITY AND COUNTY OF DENVER**

Dated August 1, 1991

**ON
LOWRY COALITION
ADDENDUM NO. 2
GROUNDWATER WELL INVENTORY
TECHNICAL MEMORANDUM
LOWRY LANDFILL
ARAPAHOE COUNTY, COLORADO
Dated July 24, 1991**

Page 1, ¶ 3

The document states "HLA assumed that any additional pumping implemented adjacent to the other boundaries of the site would offset the lateral flow perturbations caused onsite by pumping at the western boundary."

It is unclear what HLA means by "offset". While similar pumping in Section 5 east of the site would result in a mirror-image scenario, pumping south of the site in Section 7 should affect the lateral groundwater flow differently. To evaluate a truly "worst-case" scenario, modeling which includes pumping south and west of the site should have been included in this report.

Page 2, ¶ 1

The stated assumptions should also include:

~~---No extraction of fluids in Section 6 would occur.~~

An expected recharge rate to the aquifers would have been useful in evaluating the modeling.

Page 2, ¶ 3

Denver assumes that the Fate and Transport TM's will more fully evaluate current and future flow scenarios.

Page 2, ¶ 4

It would have been helpful if reproductions of the Denver Basin Rules maps accompanied this report. Because the aquifer thickness of both the Denver and the Dawson thin to the north (Van Slyke and others, 1988), a discussion of the effect of variable aquifer thickness

on the modeling should have been included in this report.

Page 3, Table

The discharge rates of 516 gpm for the Dawson and 2630 gpm for the Denver do not agree with the calculated rates using the number of wells shown on Figures 2 through 5 and per well discharge rates in the text. For the Dawson, 11 "large" wells at 37 gpm and 12 "small" wells at 6 gpm results in a total discharge rate of 479 gpm. The calculations for the Denver scenarios similarly results in total discharge rates of only 2443.6 gpm. Should the figures have had 12 "large" wells instead of 11?

Pages 3 through 5, discussion of pumping scenarios

A qualitative discussion of the scenarios' well placement and type of well ("large" vs. "small") effect on the modeling should have been included. A discussion of the historical sustained yields for Denver and Dawson wells would have been helpful.

It should be noted in this discussion that the City of Aurora Ordinance No. 87-166 prohibits the development of wells in the E1/2 of Section 1, T5S, R66W. While Denver acknowledges that ordinances cannot be considered permanent, this ordinance currently effects the site conditions.

Page 6, ¶ 2

What modeling program was used to generate the potentiometric surface maps resulting from pumping?

Page 6, ¶ 4

A reversal of gradient caused by pumping south of the site is a major assumption. Modeling should have included pumping scenarios south and east of the site.

Page 7, ¶ 1 and Figure 12

A change from northerly flow to southwesterly flow is not a "reversal" in gradient.